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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,182	05/24/2006	Simon Doclo	22409-00388-US	8012
30678 7590 02/17/2009 CONNOLLY BOVE LODGE & HUTZ LLP 1875 EYE STREET, N.W. SUITE 1100 WASHINGTON, DC 20006				
EXAMINER				
PAUL, DISLER				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,182

Applicant(s)

DOCLO ET AL.

Examiner

DISLER PAUL

Art Unit

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7; 9-11; 13-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7; 9-11; 13-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2, 5-7, 9, 14-16, 19-21 are rejected under 35 U.S.C. 103(a) as being Unpatentable over Yang et al. (US 7,206,418 B2) and Hui (US 6,999,541 B1).

Re claim 1, Yang et al. disclose of the method of reducing noise in a noisy speech signal, comprising: the steps of receiving at least two versions of said noisy speech signal at a first filter, outputting by said first filter a speech reference signal comprising a desired signal and a noise contribution (fig.2(212); 3A; col.2 line 35-40, col.5 line 8-20/wt plurality of microphone to enable) and at least one noise reference signal comprising a speech leakage contribution and a noise contribution (fig.2,3B; col.5 line 25-37/mostly noise with some speech leakage), applying a filtering operation to each of said at least one noise reference signals, and subtracting from said speech reference signal of said filtered at least one noise reference signal to provide an output version of said speech signal having reduced noise therein (fig.4 wt (450,434); col.9 line 44-49; col.10 line 5-19).

However, Yang et al. fail to disclose of the specific wherein said filtering operation of said at least one noise reference signal is performed with one of more filters having filter coefficients configured to minimize a weighted sum of the speech distortion energy and the

residual noise energy in said output version of said speech signal , said speech distortion energy being the energy of said speech leakage contributions and said residual noise energy being the energy of said noise contributions in said speech reference signal and in said at least one noise reference signal.

But, Hui disclose of a noise cancellation system wherein said filtering operation of said at least one noise reference signal is performed with one or more filters having filter coefficients configured to minimize a weighted sum of the speech distortion energy and the residual noise energy in said output version of said speech signal , said speech distortion energy being the energy of said speech leakage contributions and said residual noise energy being the energy of said noise contributions in said speech reference signal and in said at least one noise reference signal (fig.8-9; col.11 line 1-35; col.12 line 15-60; col.14 line 5-25/weighting coefficient to remove target and noise from channels based on the adaptive filter of the difference/reference channels). Thus, taking the combined teaching of Yang et al. and Hui as a whole, it would have been obvious for one of the ordinary skill in the art to have modified Yang et al. with the filtering operation of said at least one noise reference signal is performed with one of more filters having filter coefficients configured to minimize a weighted sum of the speech distortion energy and the residual noise energy in said output version of said speech signal , said speech distortion energy being the energy of said speech leakage contributions and said residual noise energy being the energy of said noise contributions in said speech reference signal and in said at least one noise reference signal for improving the noise cancellation in the presence of leakage of wanted signals in the channels.

Re claim 2, the of claim 1, wherein at least two microphones are provided , and wherein the method further comprises: receiving said speech signal at said at least two microphones and providing to said filter a version of said speech signal from each of said at least two microphones (fig.3B, col.5 line 22-27/plurality of microphones to receive speech signal).

Re claim 5, the method of claim 1, further comprising the delaying said speech reference signal before performing said subtraction of said filtered at least one noise reference signal from said speech reference signal (fig.3A wt (214A); col.6 line 30-32/wt delaying included).

Re claim 6, the method of claim 1, further comprising: applying a filtering operation to said speech reference signal; and subtracting said filtered speech reference signal and said at least one noise reference signal from said speech reference signal to provide said output version of said speech reference signal (fig.4 wt (432,434)).

Re claim 7, the method of claim 1, further comprising: adapting said filter coefficients so to take into account one or more of said speech leakage contribution and said desired signal (Hui, fig.8-9; col.11 line 1-35; col.12 line 15-60; col.14 line 5-25/weighing coefficient to remove leakage contribution from channels based on the adaptive filter of the difference/reference channels)

Re claim 9, Yang et al. disclose of the signal processor for reducing noise in a speech signal, comprising: a first filter configured to receive two versions of said speech signal, and to

output a speech reference signal and at least one noise reference signal, wherein said speech reference signal comprises a desired signal and a noise contribution , and wherein said at least one noise reference signal comprises a speech leakage contribution and a noise contribution (fig.2-3 wt (214); col.2 line 35-40, col.5 line 8-20/speech signal with noise and noise signal with some speech leakage from plurality of microphones), a second filter configured to filter said at least one noise reference signal (fig.4 wt (450); col.9 line 44-49; col.10 line 5-19), and a summer configured to subtract said at least one filtered noise reference signal and from said speech reference signal to provide an output version of said speech signal having reduced noise therein (fig.4 wt (434); col.9 line 35-45).

However, Yang et al. fail to disclose of the specific wherein said second filter has filter coefficients configured to minimize a weighted sum of the energy of said speech leakage contribution and the energy of said noise contributions in said output version of said speech signal.

But, Hui disclose of a noise cancellation system wherein said second filter has filter coefficients configured to minimize a weighted sum of the energy of said speech leakage contribution and the energy of said noise contributions in said output version of said speech signal (fig.8-9; col.11 line 1-35; col.12 line 15-60; col.14 line 5-25/weighting coefficient to remove leakage and noise from channels based on the adaptive filter of the difference/reference channels). Thus, taking the combined teaching of Yang et al. and Hui as a whole, it would have been obvious for one of the ordinary skill in the art to have modified Yang et al. with the wherein said second filter has filter coefficients configured to minimize a weighted sum of the energy of said speech leakage contribution and the energy of said noise contributions in said

output version of said speech signal for improving the noise cancellation in the presence of leakage of wanted signals in the channels.

Re claim 14, the signal processor of claim 9, wherein said second filter is further configured to filter said speech reference signal, and wherein said summer is configured to subtract said filtered speech reference signal and said at least one filtered noise reference signal from said speech reference signal to provide said output version of said speech signal (fig.4 wt (434); col.9 line 35-45).

Re claim 15, the signal processor of claim 9, wherein said filter coefficients are adaptive so as to take in to account one or more of said speech leakage contribution and said desired signal (Hui, fig.8-9; col.11 line 1-35; col.12 line 15-60; col.14 line 5-25/weighing coefficient to remove leakage contribution).

Re claim 16, 19-21 has been analyzed and rejected with respect to claims 9, 5-7.

2. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. (US 7,206,418 B2) and Hui (US 6,999,541 B1) and further in view of Marsh (US 6,178,248 B1).

Re claim 13, the signal processor of claim 9, However, the combined teaching of Yang et al. and Hui as a whole, fail to disclose of the signal processing circuit is implanted in a prosthetic hearing device. However, Marsh disclose of an adaptive & beamforming system

wherein the signal processing circuit is implanted in a prosthetic hearing device (col.1 line 11-16; col.2 line 20-29) for the purpose of providing improved intelligibility to the hearer and compensating for background noise. Thus, taking the combined teaching of Yang et al. and Hui and Marash as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify the combined teaching of Yang et al. and Hui as a whole, by incorporating the adaptive & beamforming system wherein the signal processing circuit is implanted in a prosthetic hearing device for the purpose of providing improved intelligibility to the hearer and compensating for background noise.

3. Claim 3-4, 10-11, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. (US 7,206,418 B2) and Hui (US 6,999,541 B1) and further in view of Hoshuyama (US 6,449,586 B1).

Re claim 3, the method of claim 1, wherein said first filter is a spatial pre-processor filter comprising: a beamformer filter and a blocking filter (fig.2 wt (214a, 214b)), However, the combined teaching of Yang et al. and Hui as a whole, fail to disclose of the specific wherein the blocking filter being the specific of the blocking matrix filter. However, Hoshuyama disclose of a beamforming adaptive enhancing signal wherein the blocking filter being the specific of the blocking matrix filter (fig.24-27,35; col.5 line 62-65) for the purpose of processing group of signals. thus, taking the combined teaching of Yang et al. and Hui and Hoshuyama as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify the combined teaching of Yang et al. and Hui as a whole, by incorporating the

beamforming adaptive enhancing signal wherein the blocking filter being the specific of the blocking matrix filter for the purpose of processing group of signals.

Re claim 4, the method of claim 3, further comprising: outputting by said beamformer filter said speech reference signal; and outputting by said blocking matrix filter said at least one noise reference signal (col.5 line 8-39).

Re claim 10, the signal processor of claim 9, wherein said first filter is a spatial pre-processor filter, comprising a beamformer filter and a blocking filter (fig.2 wt (214a,214b)) , However, the combined teaching of Yang et al. and Hui as a whole, fail to disclose of the specific wherein the blocking filter being the specific of the blocking matrix filter. However, Hoshuyama disclose of a beamforming adaptive enhancing signal wherein the blocking filter being the specific of the blocking matrix filter (fig.24-27,35; col.5 line 62-65) for the purpose of processing group of signals. thus, taking the combined teaching of Yang et al. and Hui and Hoshuyama as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify Yang et al. by incorporating the beamforming adaptive enhancing signal wherein the blocking filter being the specific of the blocking matrix filter for the purpose of processing group of signals.

Re claim 11, the signal processor of claim 10, wherein said beamformer filter is a delay-and-sum beamformer (fig.3A).

Re claims 17-18 have been analyzed and rejected with respect to claims 3-4.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614